

CLAIMS:

1. A probe having at least about 17 consecutive nucleotides of SEQ ID NO: 1 which comprises about 17 to about 1,000 nucleotides.

2. A probe according to claim 1, which comprises about 100 to about 1,000 nucleotides.

3. A probe having at least about 17 consecutive nucleotides of SEQ ID NO: 2 which comprises about 17 to about 1,000 nucleotides.

4. A probe according to claim 3, which comprises about 100 to about 1,000 nucleotides.

5. The probe of SEQ ID NO: 1.

6. The probe of SEQ ID NO: 2.

7. A fragment of the probe according to claim 5, which comprises about 17 to about 625 nucleotides.

8. A fragment of the probe according to claim 6, which comprises about 17 to about 674 nucleotides.

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9. A probe which is at least about 70% homologous to the probe of claim 5.

10. A probe which is at least about 90% homologous to the probe of claim 5.

11. A probe which is at least about 70% homologous to the probe of claim 6.

12. A probe which is at least about 90% homologous to the probe of claim 6.

13. A method for determining the *Mhc* genotype of a chicken, comprising:

(a) providing a genomic DNA sample from at least one chicken;

5 (b) digesting said genomic DNA sample with at least one restriction endonuclease to obtain restriction fragments;

(c) resolving said restriction fragments;

(d) optionally transferring said resolved  
10 restriction fragments to one or more hybridization membranes and optionally immobilizing said transferred restriction fragments on said hybridization membranes;

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(e) incubating said resolved restriction fragments with a first probe according to claim 1 or claim 3  
15 under conditions such that said first probe hybridizes with said resolved restriction fragments, wherein said first probe is labeled;

(f) washing said resolved restriction fragments to remove unhybridized first probe;

20 (g) creating an image of said labeled first probe hybridized to said resolved restriction fragments such that a restriction pattern is formed;

(h) determining the *Mhc* genotype of said at least one chicken from said restriction pattern; and

25 (i) optionally stripping said first probe and incubating said resolved restriction fragments with a second probe according to claim 1 or claim 3 under conditions such that said second probe hybridizes with said resolved restriction fragments, wherein said  
30 second probe is labeled and repeating steps (f) - (h).

14. A method according to claim 13, wherein said resolved restriction fragments are incubated with one probe.

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15. A method according to claim 13, wherein said resolved restriction fragments are incubated with a first probe and a second probe.

16. A method according to claim 15, wherein one of said first probe and said second probe is specific for the *Rfp-Y* system and the other of said first probe and said second probe is specific for the *B* system.

17. A method according to claim 15, wherein one of said first probe and said second probe is SEQ ID NO: 1 and the other said first probe and said second probe is SEQ ID NO: 2.

18. A method for selecting a chicken which is resistant to a preselected disease, comprising:

(a) determining the *Mhc* genotype of at least one chicken according to the method of claim 13; and

5 (b) correlating said *Mhc* genotype to said resistance to said preselected disease.

19. A method for breeding chickens to produce offspring which are resistant to a preselected disease, comprising:

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(a) selecting a first chicken of a first gender  
5 according to the method of claim 18; and

(b) mating said first chicken with a second chicken  
of opposite gender to produce offspring.

20. A method for breeding chickens to produce  
offspring which are resistant to a preselected disease,  
comprising:

(a) selecting a first chicken of a first gender  
5 according to the method of claim 18;

(b) selecting a second chicken of the opposite  
gender to said first chicken according to the method of  
claim 19; and

(c) mating said first and second chickens to  
10 produce offspring.

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